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Docket No. 2527-1A PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF APPEALS

APPEAL BRIEF

In re Application of:

MARIO TENUTA ET AL

Serial No. 09/624,098 Art Unit: 1651

Filed: July 24, 2000 Examiner: David M. Naff

Title: METHOD FOR THE TREATMENT OF A SOIL CONTAINING SOILBORNE PATHOGENS

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November 2, 2004

Commissioner for Patents
Alexandria, VA 22313-1450

Mail Stop - Appeal Brief - Patents

S I R:

On September 16, 2004, Applicant appealed from the Final Rejection of Claims 1 to 15 and 20. A copy of Claims 1 to 15 and 20 is appended hereto as Appendix A.

Applicant is enclosing the requisite fee as required under 34 U.S.C. 134 and 35 U.S.C. 41 in the amount of $170.00.

REAL PARTY IN INTEREST

The real parties in interest is Mario Tenuta, Georges Lazarovitz and Fats and Proteins Research Foundation Inc.

RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences.

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STATUS OF CLAIMS

Claims 1 to 15 and 20 remain in the application. Claims 1 to 15 and 20 stand finally rejected by the Final Office Action of June 29, 2004.

STATUS OF AMENDMENTS

The mentioned Application is a continued prosecution Application on which a first Amendment Before Action was filed on December 10, 2002. This crossed with a first Office Action issued December 17, 2002. However, as noted in Applicant's subsequent amendment, the amendment of December 10 was believed to be fully responsive to the Office Action. A further Office Action was issued September 2, 2003 to which a response was filed November 25, 2003.

A further Office Action was issued February 18, 2004 citing new references. Applicant filed a response on April 6, 2004 following which the Final Office Action dated June 29, 2004 was issued. No response has been filed to the Final Office Action.

SUMMARY OF THE INVENTION

The present invention is directed to a method for controlling soilborne pathogens. The essence of the invention comprises using a pH reducing agent to reduce the soil pH below 5.5 while incorporating a nitrogen material into the soil. The nitrogen material is present in an amount sufficient to generate nitrous acid (due to the low soil pH) the nitrous acid acting to control the soilborne pathogens.

Support for the above is found in the fourth full paragraph on page 2 of the Disclosure.

ISSUES

The issues presented for consideration by the Board of Patent Appeals and Interferences is whether Claims 1 to 12 and 20 are unpatentable under 35 U.S.C. 103(a) in view of the teachings of Muncie et al. and also in view of the teachings of Cooley (U.S. Patent 6,300,282). Also at issue and presented for consideration by the Board of Patent Appeals and Interferences is whether Claims 13 to 15 are unpatentable under 35 U.S.C. 103(a) in view of the references set forth above and further in view of U.S. Patents 5,366,533 to Behel Jr. and Weltzien et al. (U.S. Patent 4,919,702).

GROUPING OF CLAIMS

Claims 1 to 15 and 20 stand together.

THE REFERENCES AND ARGUMENT

As has been pointed out above, the essence of the present invention resides in controlling soilborne pathogens by generating nitrous acid in situ. Neither of these references contain any teachings whatsoever which would render the instant method obvious.

The primary reference is that of Muncie et al. which the Examiner has cited as showing that acid fertilizer alone will reduce potato scab infection. The Examiner has noted that the least amount of scab occurred in soils of pH 3.5 - 3.8.

However, this is only a portion of the teaching of this reference. Muncie et al. also teaches that reducing the pH sufficient to affect the growth of the potato scab organism also resulted in serious reduction in the yield (see summary - 2nd point). Muncie et al. also states that growth of the potato scab organism was only partially inhibited in soils of

low pH and that it gradually adapted itself to these conditions. (see summary - point 4). Muncie et al. still further states that there was a noticeable decrease in percentage in clean potatoes in the two crops following the second application of sulphur in 1940, although the soil pH in most plots remained lower (see summary -point 6).

Taken as a whole, while Muncie et al. teaches that there might be a temporary benefit in lowering soil pH, there is no conclusive evidence that a low soil pH per se overcomes the potato scab problem. As the author states, in 1940, the soil pH remained low yet there was still a noticeable decrease in percentage of clean potatoes. Therefore, it would appear that one skilled in the art would not conclude that soil pH is the determining factor in lowering the incidence of potato scab.

Particularly pertinent to the above point is the reference of Davis et al. (cited in the Office Action of September 2, 2003). This reference carries a date of February 1974 whereas the Muncie et al. reference referred to above carries a date of November 1944. In the Davis et al. reference, the author reviews some of the literature and concludes that scab can be reduced by applications of sulphur with little change to pH. The author quotes "the works of Vlitos and Hooker" to suggest that scab control from sulphur treatment may be the result of factors other than change in the soil pH.

During prosecution of this application, Applicant has placed on file a declaration (copy attached) by Dr. Georges Lazarovits wherein tests were done on reducing soil pH with sulphuric acid. The result was that there was no effect of a lower pH on the severity of potato scab as compared to a control treatment.

It is well established that a prior art reference must be considered in its entirety,

i.e., as a whole, including portions that would lead away from the claimed invention. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), *cert. denied,* 469 U.S. 851 (1984) (Claims were directed to a process of producing a porous article by expanding shaped, unsintered, highly crystalline poly (tetrafluoroethylene) (PTFE) by stretching said PTFE at a 10% per second rate to more than five times the original length. The prior art teachings with regard to unsintered PTFE indicated the material does not respond to conventional plastics processing, and the material should be stretched slowly. A reference teaching rapid stretching of conventional plastic polypropylene with reduced crystallinity combined with a reference teaching stretching unsintered PTFE would not suggest rapid stretching of highly crystalline PTFE, in light of the disclosures in the art that teach away from the invention, i.e., that the conventional polypropylene should have reduced crystallinity before stretching, and that PTFE should be stretched slowly.).

The reference of Muncie, as pointed out above, contains teachings that would suggest that it is not strictly a lower pH which would control potato scab.

Indeed, Applicant has submitted a Declaration showing that sulphuric acid would not control the potato scab organism.

Also, as pointed out above, there is other prior art cited by the Examiner and which prior art post dates the applied reference of Muncie et al. by some thirty years. This later prior art shows that a low pH does not control the potato scab organism.

The test for obviousness is what the combined teachings of the references would have suggested to one of ordinary skill in the art, and all teachings in the prior art must be

considered to the extent that they are in analogous arts. Where the teachings of two or more prior art references conflict, the examiner must weigh the power of each reference to suggest solutions to one of ordinary skill in the art, considering the degree to which one reference might accurately discredit another. *In re Young,* 927 F.2d 588, 18 USPQ2d 1089 (Fed. Cir. 1991) (Prior art patent to Carlisle disclosed controlling and minimizing bubble oscillation for chemical explosives used in marine seismic exploration by spacing seismic sources close enough to allow the bubbles to intersect before reaching their maximum radius so the secondary pressure pulse was reduced. An article published several years later by Knudser opined that the Carlisle technique does not yield appreciable improvement in bubble oscillation suppression. However, the article did not test the Carlisle technique under comparable conditions because Knudsen did not use Carlisle's spacing or seismic source. Furthermore, where the Knudsen model most closely approximated the patent technique there was a 30% reduction of the secondary pressure pulse. On these facts, the court found that the Knudsen article would not have deterred one of ordinary skill in the art from using the Carlisle patent teachings.)

The secondary reference of U.S. Patent 6,300,282 to Cooley was cited by the Examiner disclosing the addition of an ammonium nitrogen source to soil when growing potatoes.

Initially, it must be noted that Cooley is not concerned with soilborne pathogens. Rather, Cooley is directed to a composition and an application technique to minimize nitrate leaching by applying a surfactant to the soil adjacent a seed potato at the time of planting. In so doing, improved yields result due to the maintenance of soil moisture levels

near the potato plant root zone and/or the prevention of nitrogen and other nutrient leaching from the potato plant root zone.

Initially, in order to establish a prima facie in case of obviousness, it is well established that there must be must some suggestion or motivation, either in the references themselves or in knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. It is respectfully submitted that this is not present in the instant case. The Examiner has stated that it would have been obvious to add an ammonium nitrate source as disclosed by Cooley to increase potato yield. This is not the teaching of Cooley et al.; rather, Cooley teaches the use of a surfactant. It is respectfully submitted that there is nothing within the four corners of either these references which would suggest the combination thereof.

It is being held that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).

A statement that modifications of the prior art to meet the claimed invention would have been " 'well within the ordinary skill of the art at the time the claimed invention was made' " because the references relied upon teach that all aspects of the claimed invention were individually known in the art is not sufficient to establish a prima facie case of obviousness without some objective reason to combine the teachings of the references.

Ex parte Levengood, 28 USPQ2d 1300 (Bd. Pat. App. & Inter. 1993). See also *Al-Site Corp.* v. *VSI Int'l Inc.*, 174 F.3d 1308, 50 USPQ2d 1161 (Fed. Cir. 1999) (The level of skill in the art cannot be relied upon to provide the suggestion to combine references.).

It is again noted that the essence of the present invention resides in the fact that additions are provided to generate nitrous acid and it is this nitrous acid which then controls the soilborne pathogens. This fact was not appreciated in any of the prior art cited by the Examiner.

Respectfully,

Eric Fincham,
Reg. No. 28,201

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as Express Mail in an envelope addressed to: Commissioner of Patents and Trademarks, Alexandria, VA 22313-1450 on Nov 3, 2004

Express Mail ER 424924615 US

Eric Fincham

APPENDIX A

I CLAIM:

1. A method of controlling soilborne pathogens in a soil comprising the step of adding a nitrogen containing material and a pH reducing agent to said soil, said pH reducing agent being present in an amount sufficient to reduce soil pH below 5.5, said nitrogen containing material being present in an amount sufficient to generate nitrous acid to control said soilborne pathogens.

2. The method of claim 1 wherein said pH reducing agent is present in an amount sufficient to reduce soil pH below 5.0.

3. The method of claim 2 wherein said pH reducing agent is incorporated in said nitrogen containing material.

4. The method of claim 2 wherein said nitrogen containing material is selected from a group consisting of animal manures, sewage sludge, animal by-products, chitinaceous materials, oil- seed materials, urea, NH_4x and xNO_2 compounds wherein x is selected from the group consisting of salts of ammonium and salts of nitrite.

5. The method of claim 2 wherein said nitrogen containing material is added at a rate of between 200 kg N/hectare and 1000 kg N/hectare.

6. The method of claim 2 wherein said nitrogen containing material is an animal manure.

7. The method of claim 2 wherein said nitrogen containing material is a meat and bone meal material.

8. The method of claim 2 wherein said nitrogen containing material is soya meal.

9. The method of claim 5 wherein said nitrogen containing material is applied at a rate of between 400 kg N/hectare and 800 kg N/hectare.

10. The method of claim 7 wherein said nitrogen containing material is applied at a rate of between 600 kg N/hectare and 1000 kg N/hectare.

11. The method of claim 2 wherein said pH reducing agent is applied to said soil and said nitrogen containing material and subsequently added to said soil.

12. The method of claim 2 wherein said pH reducing agent is added to said soil subsequent to said nitrogen containing material.

13. The method of claim 2 wherein said pH reducing agent is selected from a group consisting of sulfuric acid, ascorbic acid, sorbic acid, citric acid, and SO_2.

14. The method of claim 2 wherein said pH reducing agent is an organic acid.

15. The method of claim 14 wherein said organic acid is citric acid.

16. (canceled)

17. (canceled)

18. (canceled)

19. (canceled)

20. The method of Claim 1 further including the stp of measuring the pH of the soil, measuring the buffering capacity of said soil, and adding said nitrogen containing material and said pH reducing agent to said soil when said buffering capacity is below 2 uL H_2SO_4/g soil.

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MARIO TENUTA ET AL.

Serial No.	09/624,098	Art Unit:	1651
Filed:	July 24, 2000	Examiner:	D. Naff

Title: METHOD FOR THE TREATMENT OF A SOIL CONTAINING SOILBORNE PATHOGENS

November 18, 2002

Honorable Commissioner of
Patents and Trademarks,
Washington, D.C. 20231

DECLARATION

Sir:

I, George Lazarovits, do hereby declare as follows:

THAT, I am one of the inventors named in the above identified application;

THAT, I am aware of the rejection set forth in the Office Action of July 2, 2002 wherein the Examiner states that the primary reference of Anderson et al. discloses that potato scab disease is known to be controlled by increasing soil acidity;

THAT, I had the following test done to show the effect of reducing soil pH with sulfuric acid and the results on potato scab disease, the summary of the test being set forth hereinbelow;

Purpose:

Nitrite becomes converted to nitrous acid under acid conditions. At about pH 4.3 nitrite and nitrous acid are in equilibrium (50:50). Nitrite has no toxicity to microorganisms such as *Streptomyces scabies*, the bacteria that causes potato scab. Nitrous acid at 0.03 mM however, is lethal. In order to obtain sufficient amounts of nitrous acid it is necessary to lower soil pH for a short time to about pH 4 - 5. This study was carried to determine the effect lowering the pH, in the absence of nitrite, on disease incidence caused by *S. scabies*.

Materials and Methods:

Soil known to have high disease pressure for potato scab was collected from a commercial potato field in Ontario in the spring of 2001 and brought to the London research station. An experiment was set up using microplots. Soil (13 kg) was placed in drainage tiles (25 cm deep, 25 cm diam) that had been buried in soil to ground level. The soil pH in some soils was reduced by adding sulfuric acid (45%, obtained from Ethyl Canada Ltd., Sarnia, ON). Acid (7.2 and 16.9 mL) was added to water (390 mL) and the water was then added to soil. The pH was found to be reduced from 6.5 to about 5 and 4, respectively (Figure 1). One week later, a potato seed piece was planted in each tile (four tiles per treatment). The tubers were harvested in the fall and rated for scab on a scale of 0-6 based on the percentage of tuber surface covered with scab lesions where 0 = 0%, 1 = trace to 5%, 2 = 6-15%, 3 = 16-25%, 4 = 26-35%, 5 = 36-60%, and 6 = 61-100%.

Results and Discussion:

Soil pH was reduced to 5 and 4 at day zero by the addition of sulfuric acid (Figure 1). Within 2 days however, the pH in acidified soils was up by half a log unit

and at the end of a week a full log unit (Figure 1). Since nitrous acid kills *S. scabies* bacteria within hours the length of time the pH stayed low would have been more than sufficient to control disease. By week 6 the pH was nearly identical in both treatments to the control soil (Figure 1). At harvest we found no effect of pH alterations on the severity of potato scab as compared to the control treatment (Figure 2). Scab severity was near maximum in all treatments. This demonstrates that low pH and acid alone has no effect on disease incidence.

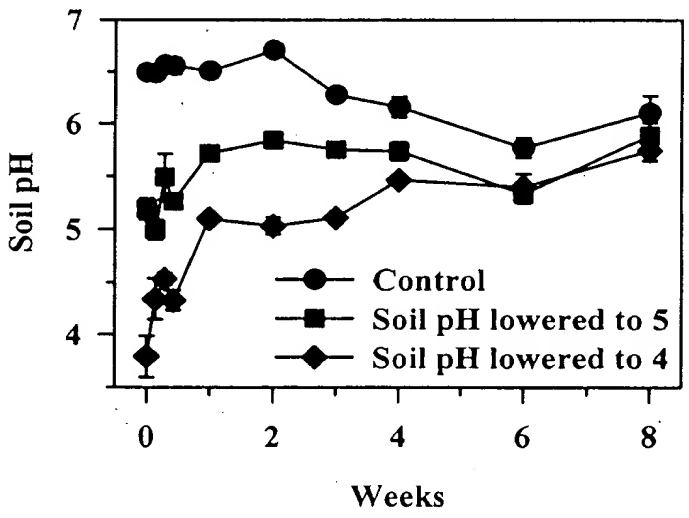

FIGURE 1. Reduction of the pH of a soil from a commercial potato field in Ontario using sulfuric acid. Soil pH was then monitored for 8 weeks. Error bars represent S.E., n = 4.

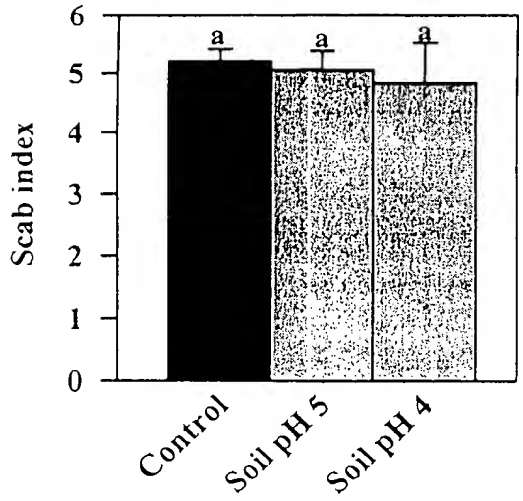

FIGURE 2. Effect of reducing soil pH on potato scab severity. The pH of a soil from a commercial potato field was reduced with sulfuric acid (see Figure 1). Potatoes were planted 1 week later and tubers harvested in the fall were rated for scab on a scale of 0-6 based on the percentage of tuber surface covered with scab lesions where 0 = 0%, 1 = trace to 5%, 2 = 6-15%, 3 = 16-25%, 4 = 26-35%, 5 = 36-60%, and 6 = 61-100%. Error bars represent S.E., n = 4. Treatments with the same letter are not significantly different at the 0.05 probability level.

THAT, as shown by this test, the reduction of soil pH by sulfuric acid has no effect on potato scab disease.

FURTHER DEPONETH SAYETH NOT.

George Lazarovits

SIGNED this 29th day of November, 2002.